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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
NGUYEN, COLETTE B	
ART UNIT	PAPER NUMBER
1732	

NOTIFICATION DATE	DELIVERY MODE
06/23/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/584,466	BOHMHAMMEL ET AL.	
	Examiner	Art Unit	
	COLETTE NGUYEN	1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 April 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 5-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 5-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of the application.

Responses filed on 04/12/2011

Claims 1, 5, 6, 7, 8, 9 are amended. Claims 2-4 are canceled. Claims 11-19 are new. .

Claims 1, 5-19 are presented for examination

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claims 1, 5-19** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.). In the present instance, claim 1 recites the broad recitation of 300-1000C, and the claim also recites 600-950C which is the narrower statement of the range/limitation.. A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render

a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 1 recites the broad recitation of 300-1000C, and the claim also recites 600-950C which is the narrower statement of the range/limitation.

Claim Rejections - 35 USC § 103

1. **Claims 1, 5-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Roewer et al. (US5,716,590), in view of Manogue et al.(US6,548,720) and Berty (US5,021,383)

2. Regarding claims 1, 15 and 16.The claim pertains to a process of removal a halogen atom (known as hydro dehalogenation) from $SiCl_4$ to make $HSiCl_3$ at 300-1000C and pressure from 0.1 to 100 bar abs, in the presence of hydrogen and a support catalyst by contacting a mixture of $SiCl_4/H_2$ with molar ratio from 1:09 to 1:20 with a catalyst in a reactor (fixed bed, fluidized-bed or a moving-bed). The claim is further limited with the limitation of the composition catalyst wherein the support is SiO_2 or fused silica or leached glass, and the catalytic component comprising at least one metal or metal salt from group IIA. However, this process is unpatentable as it is obvious under 35 U.S.C. 103 (a) as Roewer(590) discloses a process for catalytic hydrodehalogenation of a halogen-containing compound of carbon or silicon such as silicon tetrachloride ($SiCl_4$) to trichlorosilane ($HSiCl_3$) in the presence of hydrogen at a

temperature range of 100C-1000C at about 1 atm (equivalent to 1 bar) in the presence of hydrogen and a support catalyst. Roewer' catalyst comprises of silicon and at least one transition metal or salt of the metal (col 4, line 65)) (col1, line 45-60 and col4, line 40).The support comprises ceramic carriers or SiO_2, zeolites (Col5, line 22, 35) with the atomic ratio of metal to silicon in the range from 100:1 to 1:100, preferably from 20:1 to 1:20. (Col2, line 16-20). The claim has catalyst content as 0.1 to 10 wt%, calculated as element. Roewer teaches molar ratio of hydrogen to the halogen is 1 to 20 per halogen atom which is to be cleaved (COl2, line 50-55) vs the claim of $SiCl_4/H_2$ with molar ratio from 1:09 to 1:20. Roewer does not disclose a catalyst system comprising elements of group IIA of the periodic table (calcium, strontium, barium).

3. Manogue et al. (720) discloses a hydrodehalogenation catalyst comprising transition metals and other components, some of which are considered to improve the activity and/or the longevity of the catalyst composition such as barium. (Col 3, line 30) with molar ratio of H_2: $CF_3CCl_2CF_3$ (the compound to be hydrodehalogenated such as $SiCCl_4$) to 1:1 to :30: 1. (Col4, line 18). The catalyst may be supported or unsupported and the supports of fluorides of metals of group IIB are preferred, especially calcium. (Col 3, line 9, line 30, line 37).

4. Berty (383) discloses a catalyst wherein the catalytic active material, also transition metals in combination with alkali or alkali-earth carbonates (salts) is used to convert the toxic chlorocarbons to non-toxic products, especially the salt (Carbonates, bicarbonates) not only act as a dispersing media or a carrier but also react with

hydrogen chloride, a by-product of the reaction to form the chloride salt or the alkali part of the carbonates. The catalyst is supported on glass wool (Col2, line65, Col3, line 20-45, col 4, line 28).

5. The subject matter as a whole would have been obvious for one of ordinary skill in the art at the time of the invention to improve Roewer's catalyst with both teachings of Manogue and Berty of a catalyst comprising alkaline earth metals and their salts (the elements of the Group II in the periodic table) which improve the activity and longevity of the catalyst composition, especially knowing that the by- product of preparing $HSiCl_3$ from $SiCl_4$ in the presence of hydrogen is HCl therefore the alkali earth metal or its salts would form chloride salt of the alkali therefore converting to non toxic materials and lower cost.

6. Regarding claim 5. The claim further limits the composition of the catalyst, however it does not change the process of claim 1 which is obvious over Roewer in view of Manogue and Berty as discussed above. Roewer discloses an atomic ratio of metal (catatyst component) to Si to be 100:1 to 1:100 (col 2, line 18). Manogue discloses a weight ratio of 1 to 20 %wt. (Col3, line 45). The subject matter as a whole would have been obvious for one of ordinary skill in the art at the time of the invention to substitute the catalyst or Roewer with the catalyst of Manogue and with optimization and experimentation anyone with ordinary skill would derive to the claim of 1 to 8 w % by wt which is within the disclosed range therefore encompassed.

7. Regarding claims 6, 11 and 12. .Roewer teaches a 1 to 20 molecules of H_2 are used per halogen atom to be cleaved (Col2, line 53) and Manogue teaches a molar ratio

of hydrogen: $CF_3CCl_2CF_3$ (the compound to be hydrodehalogenated such as $SiCCl_4$) to 1:1 to 30:1. (Col4, line 18). The subject matter as a whole would have been obvious for one of ordinary skill in the art at the time of the invention to know that if H_2: $CF_3CCl_2CF_3$ is 1:1 to 30:1, preferably, 1:1 to 3: 1. (col4, line 18). then H_2: $SiCl_4$ should also 1:1 to 30:1. The claim is 1:1 to 10:1 is within the disclosed range therefore it is a prima facie of obviousness.

8. Regarding claims 7, 13 and 14. Rower discloses the reaction can be carried in a trough-flow apparatus. (Col 2, line 62). Manogue teaches that any type of reactors can be used (co 7, line 25) and the claimed of a fixed –bed reactor, a fluidized-reactor or a moving-bed reactor are within the disclosures of both Roewer and Manogue teachings (Corbin, Col 5, ln. 28-35).

9. Regarding claim 8. Roewer discloses the catalytic reaction is carried out at a temperature in the range from 300-1000C and at 1 atm or 0.98 bar (Roewer,Col 2, ln 57-62, and Col 3, ln46-58). Manogue discloses a temperature of about 350C, and Berty discloses a temperature of 750-1000C (Col2, line 18). However, pressure and temperature are effective variables which can be optimized and the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time of the invention to select the portion of the prior art range which is within the range of the applicant claims because it has been held prima facie case of obviousness to select a value in a known range by optimization for the results. In *re Boesch*, 205 USPQ 215, in *re Malagari,* 182 USPQ 549. It would have been obvious to one of ordinary skill in the

art to optimize these conditions through routine experimentation in order to obtain the best results.

10. Regarding claim10. Roewer in view of Manogue and Berty disclose a process as claim 1 wherein trichlorosilane is isolated from the product mixture.

11. **Claims 9 and 17, 18, 19**. are rejected under 35 U.S.C. 103(a) as being unpatentable over Roewer et al. (US5,716,590), in view of Manogue et al.(US6,548,720) and Berty (US5,021,383) as applied to claim 1 with further in view of Grover et al. (US2003/0152504). Roewer in view of Manogue and Berty do not teach space velocity. Grover '504 teaches hydrodehalogenation process wherein the space velocity is from 3000- 10000 h^{-1} (table 4, para 64). The claim has 2000-30000 for claim 9 and 5000-15,000 for claim 17 which overlap with Grover disclosure therefore it is a prima facie of obviousness. As for linear velocity of the gas stream, Manogue discloses the gas velocity of 2.0 $x10^{-6}$ m^3/s at 150C and it is the examiner position that it is within the skill of anyone in the art to derive at the optimal liner velocity as it is an effective variable.

Response to Arguments

Applicant's arguments filed 04/12/2011 have been fully considered however they are not persuasive therefore the rejections stand. As discussed in claim1, the invention pertains to a process with limitation of the catalyst composition. It is correct to assert that Roewer does not teach the catalyst composition as claimed, however Roewer DOES teach the process of claim 1. The catalyst of the instant claim is obvious per the

disclosure of Roewer in view of Manogue who discloses to use of element of group IIA for further improvement and effectiveness of the catalyst, and Berty teaches to use alkaline earth metal salt and calcium chloride , strontium chloride, barium chloride are alkaline earth metal salt.

Conclusion

3. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to COLETTE NGUYEN whose telephone number is (571)270-5831. The examiner can normally be reached on Monday-Thursday, 10:00-4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curt Mayes can be reached on (571)-272-1234. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/COLETTE NGUYEN/
Examiner, Art Unit 1793

June 17, 2011

/Melvin Curtis Mayes/
Supervisory Patent Examiner, Art Unit 1732